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Proton Dose Distributions Calculated with the PEREGRINE All Particle Monte Carlo Code

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PEREGRINE is an All Particle Monte Carlo radiation transport code that calculates 3D dose distributions from photon, electron, neutron, and proton beams used in radiotherapy. To define the proton beams used in these calculations, PEREGRINE transports predefined source particles through a collimator system and other patient-specific beam modifiers. Initial source particle energy and angular distributions are obtained from LAHET/MCNP calculations. Absorbed dose is tallied in the patient or phantom as Monte Carlo simulation particles are followed through a cartesian transport mesh that has been manually specified or determined from CT scan data. Nuclear interaction effects are included for heavy particles. The nuclear interaction data for 0-250 MeV protons and neutrons are taken from a recently created, evaluated database, assembled by combining all available measurements with FKK-GNASH nuclear model calculations. We will discuss impact of the new nuclear data and compare preliminary calculations of dose distributions to measurements.

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